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10/757,314

01/14/2004

Mohammed Mahbubur Rahman

WJT08-0053  
(JSF001-0002)

3500

7590

03/24/2006

EXAMINER

HAM, SEUNGSOOK

William J Tucker  
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ART UNIT

PAPER NUMBER

2817

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/757,314

Applicant(s)

RAHMAN ET AL.

Examiner

Seungsook Ham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 February 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7,9-19 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-19 and 21-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the subject matter of claims 11 and 23 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the first layer with resistive paste.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-7, 10-13, 17-19 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peters (US '259) in view of Liang et al. (US 6,492,883) and Ammar et al. (US '404).

Peters (figs. 4A-4C) discloses a multilayer filter comprising: a first resonator 208a on a first dielectric layer 202c; a second resonator 206 coupled to the first resonator on a second dielectric layer 202b; and a third resonator 208b coupled to the second resonator and cross coupled to the first resonator; an input transmission line 207a connected to the first resonator; and an output transmission line 207b connected to the third resonator; and two ground planes 200, 203 are provided on upper and bottom planes.

Peters does not show a voltage variable capacitor is coupled to at least one of the resonators and the first and second resonators are disposed on a LTCC (low-temperature co-fired ceramic).

Liang et al. (figs. 6-9) discloses a similar combline filter having voltage variable capacitors coupled to resonators to tune each resonant frequency or the center frequency of the filter and also teaches using tunable capacitors in a filter to tune the resonant frequency (col. 5, lines 14-25). Moreover, Liang et al. teaches that tunable duplexers (e.g., filters) can cover larger frequency band than fixed duplexers (col. 9, line 63 – col. 10, line 6). Furthermore, DC bias circuit 78 (see fig. 6) for tuning the variable capacitor.

Ammar et al. (figs. 7-9) discloses a multilayer filter having a plurality of resonators 54 formed on LTCC layers.

It would have been obvious to one of ordinary skill in the art to provide a voltage tunable variable capacitors of Liang et al. in the device of Peters to tune in different frequencies (including the center frequency) for fast tuning capability, small size as well as improve the insertion loss as shown by Liang et al. (col. 5, lines 11-26, col. 6, lines 45-67), and also forming the first and second resonators on a LTCC in the modified device of Peters to obtain a high "Q" filters in a small spaces and lower manufacturing tolerances as taught by Ammar et al. (col. 1, line 31 – col. 2, lines 13).

Providing nine layers of LTCC is considered as an obvious design modification since Ammar shows LTCC is made of a plurality of co-fired ceramic layers (col. 3, lines 53-65).

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In response to the applicant's argument that it is not obvious to combine LTCC material while using voltage tunable dielectric material (see REMARKS, filed on 2/16/06, p. 15), the examiner respectfully disagrees.

It should be noted that claims 1 and 13 merely recites "a voltage tunable variable capacitor in at least one of said resonators". Ammar et al. clearly teaches the advantage of using LTCC instead of conventional dielectric material (col. 1, lines 31-50). Moreover, Ammar et al. teaches forming a stripline filter using a multilayered LTCC material. Since claims do not disclose any specific structures in each of the layers, it is the examiner's position that providing nine layers would have been obvious design modification as one desires. Applicant's argument that each layer has different components (see REMARKS, p. 15, last paragraph) is not persuasive since the claims do not contain such structure.

Claims 4, 9, 14-16 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peters (US '259) in view of Liang et al. (US 6,492,883) and Ammar et al. (US '404) as applied to claims 1-3, and 13 above, and further in view of Pickett (US '499).

The modified device of Peters does not show biasing circuit having a resistor and/or DC blocking capacitor. However, such design technique is well known in the art. Pickett (figs. 1-4) discloses a voltage control tunable filter having a DC bias circuit having a resistor 22 and a DC blocking capacitor 30, 102 (col. 3, lines 13-28). It would have been obvious to one of ordinary skill in the art to provide a resistor and/or DC

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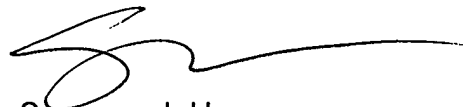
blocking capacitor in the modified device of Peters to eliminate undesired parasitic tuning or coupling as taught by Pickett (col. 2, lines 6-30).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seungsook Ham whose telephone number is (571) 272-2405. The examiner can normally be reached on Monday-Thursday, 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on (571)-272-1769. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Seungsook Ham  
Primary Examiner  
Art Unit 2817

sh